

## PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) IMPROVED DEVICE FOR FILLING PUSH-BUTTON DISPENSERS

(71) We, J. R. GEIGY S.A., a corporation organised under the laws of the Confederation of Switzerland, of 215, Schwarzwaldallee, Basle, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 This invention relates to a device for the filling, with propellant and an active agent either simultaneously, or in succession, of a push-button dispenser, for example an aerosol dispenser, of the kind in which the propellant and the agent to be dispensed are contained in separate containers, which are for example juxtaposed or arranged one inside the other.

Such dispensers are not necessarily intended for the atomisation of the active agent which they contain, but can also serve to discharge the active agent in the state of a foam, jet, paste or the like, it being understood that the two stages, the agent to be dispensed and the propellant, are contained in separate containers.

The filling device is particularly applicable to dispensers of the kind described wherein the dispenser valve is actuated by means of a push-button detachably arranged on a hollow, slideable stem, the stem controlling two obturator means situated respectively in the propellant flowpath and in the agent flowpath. In such dispensers the stem of the push-button, arranged to slide in the body of the valve is traversed by two ducts each belonging to one of the two first mentioned flowpaths. The orifices of these ducts toward the exterior are made accessible from the outside by removing the head of the push-button, so that by exercising pressure on the sliding stem, the inner apertures of these ducts open, respectively, a free path into the propellant container and 45 that containing the active agent.

[Price 5s. Od. (25p)]

In particular the filling device according to the invention can be applied advantageously but not exclusively to dispensers of the type described and claimed in British Patent Application No. 52,433/67 (Serial No. 1212373).

In a conventional aerosol dispenser, the agent to be atomised is accommodated in the same container as the propellant under pressure which is generally in liquid phase and gaseous phase at the same time. The agent to be atomised is inserted either before the closure of the container or after, it being observed that one of the principle features of a valve for dispensers of this type is the ability to be traversed by a fluid in the opposite direction to that provided for utilisation.

In turn the propellant can be inserted either at the moment of the closure before a cup carrying the valve is mounted on the body of the container, or through the valve, the container having been previously closed.

For dispensers of this type it is known to construct filling devices comprising a head actuated with a reciprocating motion and intended to cover the body of the dispenser valve during filling. This head is traversed by an inlet duct for the propellant fluid whose circulation is controlled by an inner valve.

However it is not known to fill, via the dispenser valve, push-button dispensers in which the propellant and the agent to be dispensed are contained in separate containers. One object of the present invention is to remedy this defect.

According to the invention there is provided a device for filling a push-button actuated dispenser with a propellant and an agent to be dispensed, the dispenser being of the kind in which the propellant and the agent are contained in separate containers, and the valve means of the dispenser comprise a push-button detachably arranged on

a hollow, slidable stem, this stem controlling two obturator means situated respectively in the propellant flowpath and in the agent flowpath, said filling device comprising a sliding, reciprocating head, a propellant source and an injection nozzle, the head being traversed by a duct connected upstream to the said source of propellant under pressure and downstream to the said injection nozzle, characterised in that the head comprises a second duct connected upstream to a source of the agent to be dispensed and opening out downstream into the injection nozzle, and sealing means accommodated in the head and adapted to engage the stem of the push-button of the dispenser to be filled in order that when the sealing means is engaged with the push-button stem it separates in a fluidtight manner within the injection nozzle two independent flowpaths intended respectively for the passage of the propellant and of the agent to be dispensed.

In a preferred embodiment of the invention, the injection nozzle comprises a chamber into which open the inlet ducts for the propellant and for the agent to be dispensed, the apertures of these two ducts being separated from each other by an annular gasket engaged sealingly by the stem with the push-button removed, when a dispenser is in the filling position.

The invention will now be described in greater detail by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a schematic diagram of a filling station embodying the invention, the dispensers to be filled being shown in dash-dotted lines.

Figure 2 is a view in axial section, on a larger scale, of the injection head of the filling device according to the invention and of the upper part of a dispenser to be filled with the push-button indicated by dash-and-dotted lines, being removed; both the injection head and the dispenser being shown at rest, and

Figure 3 is a similar view to Figure 2 showing the two units of Figure 2 engaged with each other and in the course of filling the dispenser.

Referring to Figure 1 of the drawings more in detail, it may be seen that the filling station comprises a table 1 on which are placed dispensers A of the kind in which the propellant and the agent to be dispensed are accommodated in separate containers. The filling station further comprises as parts 60 of a filling device according to the invention a head 2 carried by a stem 3 of a jack 4 which latter is connected to a housing 5, sliding on a fixed upright 6. The position of the jack 4 is fixed by a clamping member

65 7.

The filling head 2 is connected by a flexible pipe 8 to a metering device 9 fed with propellant under pressure by a pipe 11 from a reservoir (not shown). Valves 12 and 13 control the flow of the propellant. The 70 metering device 9 comprises a sliding piston 14 actuated by a piston drive 15 of adjustable stroke which is operated by compressed air.

There is also connected to filling head 2 75 a flexible pipe 16 from a metering device 17 fed with the agent to be dispensed by a pipe 18; a piston 19 of the metering device 17 is itself actuated by a piston drive 21 which is of adjustable stroke and operated by compressed air.

The filling head 2 (Figure 2) comprises two threaded ducts 22, 23 serving respectively for fixing therein the pipes 8 and 16.

The duct 22 opens via one or several ports 85 24a into an axial chamber 24 in which is mounted slidably a core 25 of magnetic material thus forming a dip core subjected to the field of an electromagnet 26. The core 25 is provided with an axial recess in 90 which is mounted a projecting finger 27 which is urged by a spring 28 towards a seating 29 traversed by an axial duct 31 serving for the passage of the propellant. At rest the finger 27 engages the seating 29 and thereby obturates duct 31, thus preventing the propellant under pressure admitted by the pipe 8 from passing into the said duct 31.

The filling head 2 terminates in an injection nozzle 30 constituted by a thin-walled sleeve 32 which surrounds cup-shaped injection chamber 33 into which the duct 31 opens.

Also opening into the chamber 33 is a 105 duct 34 which communicates with the threaded duct 23. The apertures of the ducts 31 and 34 are separated by a toroidally shaped sealing member 35 whose purpose will be explained further below.

The filling device thus constituted can serve in particular for filling aerosol dispensers, of the type known *per se* and shown in Figure 2, and which is described in detail in the patent application mentioned previously.

It will be sufficient to say here that such a dispenser comprises an outer container 41 closed by a cover 42 having an aperture with a funnel-shaped rim 43 and, in the valve body, an inner chamber 44 containing a first low-pressure, annular sealing member or gasket 45 controlling the passage of the agent to be dispensed. The gasket 45 is gripped about its periphery by the upper 120 rim of a stopper 46 in which the stem 47 of the push-button is slidably arranged. The stem 47, which contains a duct 48 for the passage of the propellant in the gaseous state, is urged by a spring 49 towards the 130

- closure position, and extends through a high-pressure sealing member, e.g., gasket 51. The latter is retained by a neck 52 of the container 53 containing generally liquid propellant. The container 53 is attached to an annular rim 54 of the member 46 by means of a rim 55 provided around its own neck. A dip tube 56 starts from the chamber 44 and penetrates into the container 41.
- 10 When the dispenser is in filled condition, the outermost part 47a of the stem 47, which part is of reduced diameter as compared with the adjoining item portion, is covered by a push-button 57 which contains an atomiser nozzle 58 connected by appropriate ducts, provided in the push-button, on the one hand to the duct 48 and on the other to an annular duct 61 in the form of a groove or grooves located in the surface of the stem 47 and destined for the passage of the agent to be dispensed. The stem 47 carries a collar 63 which at rest bears against the gasket 45 under the pressure of a spring 49. Downward movement of the stem 47 is limited by stop members 64 protruding into the chamber 44.
- The inner and outer diameters of the injection nozzle 30 are so dimensioned as to make possible easy insertion into the space 30 comprised between the stem 47 and the cylindrical wall of aperture 43a in which the frustoconical bearing surface 43 terminates, the push-button 57 having not yet been mounted or having been previously removed. Furthermore the inner diameter of the gasket 35 is so dimensioned as to permit sealing engagement therewith of the reduced part 47a of the stem 47.
- 40 Finally the height of the sleeve 32 and the slope of the frustoconical bearing surface 62 provided at the lower part of the head 2, are determined so as to permit a mutual abutment of the projection 63 and the stop members 64 at the same time leaving a space 45 between the frustoconical bearing surfaces 43 and 62, whereas the sleeve 32, in this position, presses against and deflects the gasket 45 and establishes a fluidtight contact with the latter.
- 50 The operation of the filling device thus arranged is as follows (Figure 3):
- The dispenser A, shown in Figure 3 with the push-button 57 removed, is arranged immediately below the vertical axis XX of the head 2. The latter is then lowered by the action of the jack 4 until the projection 63 comes to rest on the stop members 64. At the same time the gasket 45 toward the interior 60 of the dispenser. At the same time, the stem 47 penetrates into the injection chamber 33, the tapered top rim of part 47a thereof penetrating into the central opening in the gasket 65 35. This penetration is completed when the stem 47 has reached the end of its downward travel, establishing in doing so free communication between the duct 48 and the container 53, via the aperture 48a, which passes out of the gasket 51 and into this 70 container.
- At this moment the electromagnet 26 is excited and attracts the core 25. The obturating finger 27 is lifted from its seating 29, and the propellant can now enter 75 the duct 31 from where it passes into the duct 48 of the stem 47 and finally into the container 53 (arrows P). The flow of the propellant is ensured by the piston 14 of the metering device 9.
- 80 Preferably at the same time, although the coincidence of the operations is not necessary, the agent to be dispensed is pressed by the piston 19 of the metering device 17 into the duct 34, from where it penetrates 85 into the chamber 33 of the injection nozzle. As the sleeve 32 has deflected the gasket 45 inwardly, the agent to be dispensed enters into the chamber 44 and passes from there into the dip tube 56 from where it flows into 90 the interior of the container 41 (arrows D). Air present in the container can now escape as indicated by the arrows M, as it is replaced by the agent to be dispensed.
- 95 The invention thus makes possible a very rapid and automatic filling of aerosol dispensers of the type herein-before described. The electro-magnetic valve means constituted by the coil 26, obturating finger 27 and the seating 29 makes it possible to reduce the loss of propellant to a minimum. Moreover, in view of the fact that the agent to be dispensed generally has a low vapour pressure, it is only necessary to provide a simple weighted valve, set at a given pressure, at the outlet of the metering piston 17 in the flowpath of the product.
- 100 The present invention affords substantial advantages; empty dispensers, finished and ready for use as regards their mechanical members, can be filled up by means of a single filling head. It is therefore sufficient to arrange a single filling station which can be integrated in an automatic production line.
- 110 The dispenser manufacturer can moreover deliver the dispensers in a finished condition to an aerosol processor who only has to purchase a filling head.. It is thus possible to clearly separate the roles of these two specialists.
- 115 It is evident that the invention is not limited to the means described and that in particular modifications can be made both to the dispenser head and its control and furthermore to the aerosol dispenser itself.
- 120 Thus, owing to a suitable arrangement of the valves in the circuit P of the propellant, it is also possible, through the correspond-
- 125 130

ing flowpath, to create a vacuum in the reservoir 53 before the filling with propellant.

Similarly if an additional flowpath is provided in the filling device, with the appropriate valves, it is possible to inject a washing liquid for example a disinfectant through the flowpath D, and to pump it out again where after the filling of the product to be dispensed can be effected.

**10 WHAT WE CLAIM IS:—**

1. A device for filling a push-button actuated dispenser with a propellant and an agent to be dispensed, the dispenser being of the kind in which the propellant and the agent are contained in separate containers. and the valve means of the dispenser comprise a push-button detachably arranged on a hollow, slideable stem, this stem controlling two obturator means situated respectively in 15 the propellant flowpath and in the agent flowpath, said filling device comprising a sliding, reciprocating head, a propellant source and an injection nozzle, the head being traversed by a duct connected upstream to the said source of propellant under pressure and downstream to the said injection nozzle, characterised in that the head comprises a second duct connected upstream to a source of the agent to be dispensed and 20 opening out downstream into the injection nozzle, and sealing means accommodated in 25

the head and adapted to engage the stem of the push-button of the dispenser to be filled in order that when the sealing means is engaged with the push-button stem it 35 separates in a fluidtight manner within the injection nozzle two independent flowpaths intended respectively for the passage of the propellant and of the agent to be dispensed.

2. A device as claimed in claim 1, characterised in that the injection nozzle comprises a chamber into which the two inlet ducts of the propellant and of the agent to be dispensed open, the apertures of these two ducts being separated from each other 45 by an annular gasket engaged sealingly by said stem during filling of the dispenser.

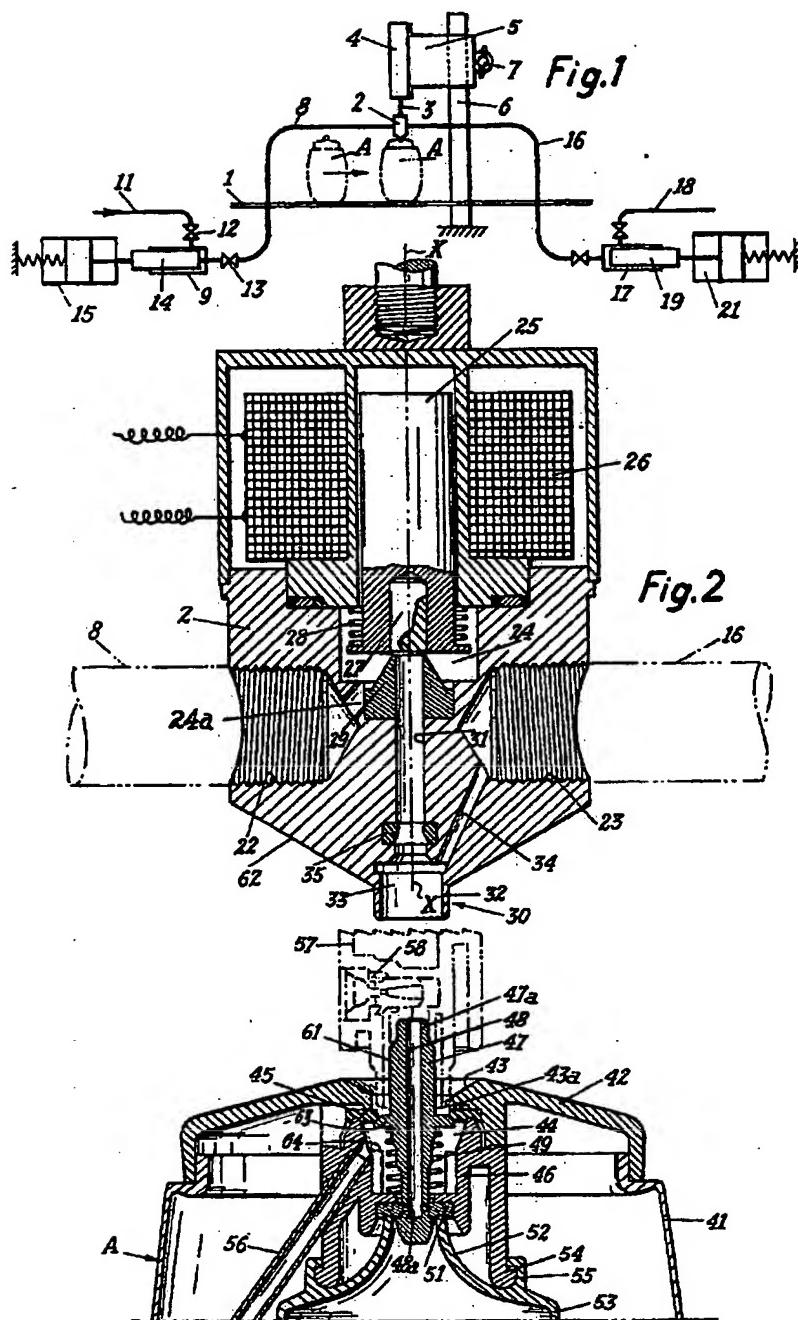
3. A device as claimed in claim 1 or claim 2, characterised in that the injection nozzle comprises a collar arranged to be inserted, 50 when in the filling position, between the stem of the push-button and the valve mounting.

4. A device for filling a push button dispenser substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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1,212,374 COMPLETE SPECIFICATION

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SHEET 1

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SHEET 2

